| AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT | 1. CONTRACT ID CODE<br>K | PAGE OF PAGES<br>1 \| 31 |
|---|---|---|

| 2. AMENDMENT/MODIFICATION NO. | 3. EFFECTIVE DATE | 4. REQUISITION/PURCHASE REQ. NO. | 5. PROJECT NO. *(If applicable)* |
|---|---|---|---|
| 0001 | See Blk. 16C | N/A | |

| 6. ISSUED BY | CODE SC0600 | 7. ADMINISTERED BY *(If other than Item 6)* | CODE SC0600 |
|---|---|---|---|
| DEFENSE ENERGY SUPPORT CENTER, ROOM 2954<br>8725 JOHN J. KINGMAN ROAD, SUITE 4950<br>FT. BELVOIR, VA 22060-6222 FAX 703-767-9044<br>BUYER/SYMBOL – ERIN S. RALPH/DESC-BZD<br>PHONE - (703) 767-9294 PPNs: 2.99 | | | |

| 8. NAME AND ADDRESS OF CONTRACTOR *(NO.,street,city,county,State, and ZIP Code)* | | 9a. AMENDMENT OF SOLICITATION NO. |
|---|---|---|
| | X | SP0600-05-R-0012 |
| | | **9b. DATED** *(SEE ITEM 11)*<br>November 15, 2004 |
| | | **10a. MODIFICATION OF CONTRACT/ORDER NO.** |
| | | **10b. DATED** *(SEE ITEM 13)* |

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

[ X ] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [ ] is extended, [ X ] is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

**12. ACCOUNTING AND APPROPRIATION DATA** *(If required)*

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

| | |
|---|---|
| | A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10a. |
| | B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b) |
| | C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: |
| | D. OTHER *(Specify type of modification and authority)* |

E. **IMPORTANT:** Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. **DESCRIPTION OF AMENDMENT/MODIFICATION** *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

**SEE ATTACHED PAGES**

Except as provided herein, all terms and conditions of the document referenced in Item 9a. or 10a., as heretofore changed, remains unchanged and in full force and effect.

| 15A. NAME AND TITLE OF SIGNER *(Type or print)* | | 16A. NAME OF CONTRACTING OFFICER<br>JOHN R. WALKER | |
|---|---|---|---|
| **15B. NAME OF CONTRACTOR/OFFEROR**<br>BY _____<br>*(Signature of person authorized to sign)* | **15C. DATE SIGNED** | **16B. UNITED STATES OF AMERICA**<br>BY _____<br>*(Signature of Contracting Officer)* | **16C. DATE SIGNED**<br>1-7-05 |

SF30

**A The changes set forth herein are incorporated into solicitation SP0600-05-R-0012. Please acknowledge receipt and acceptance of the subject amendment.**

1. **Addendum Package**

a. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 5, Paragraph A, is deleted and replaced with the following:

A. JP8 REQUIREMENT: DESC requires 350 transport tank trucks with a minimum of 8,000 USG capacity and drivers to deliver up to 1,000,000 USG of Turbine Fuel, Aviation (JP8) per day from the Mina Abdullah Truck Fill Stand (TFS) to Camp Buehring, Kuwait; Ali Al Saleem AB, Kuwait; and, Cedar II-Tallil AB, Iraq. Trucking services are required to be available on a 24 hours per day, 7 days per week basis.

b. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 5, Paragraph B, is deleted and replaced with the following:

B. JP8 CONTRACT PERFORMANCE PERIOD: One year contract for the period 1 March 2005 through February 28, 2006 (with two (2) six (6) month option periods). DESC reserves the right to reduce/delete transport trucks and change, add or modify transport truck origin points in Kuwait and delivery locations in Kuwait and Iraq, as necessary.

c. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 5, Paragraph C.1.f. is revised as follows:

f. Contractor shall provide licensed and responsible drivers per truck and all necessary services and supplies to include necessary equipment and life support for drivers in the performance of this scope of work. Contractor is responsible for arrangements for necessary visas, fees and passports for its drivers and providing DESC with the names, driver license numbers, copy of passports, copies of birth certificates of transport truck drivers and transport truck identification information. Drivers (1 each per truck) employed by the Contractor must be certified to transport hazardous/flammable goods.

d. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 6, Paragraph C.4.a. is revised as follows:

a. Contractor is responsible for setting up and operating a single staging area within Kuwait for all its trucks under the resulting contract.

e. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 9, Paragraph D, is deleted and replaced with the following:

D. MOGAS AND DIESEL REQUIREMENTS: DESC requires 70 transport tank trucks with a minimum of 8,000 USG capacity and drivers to deliver up to 200,000 USG of Diesel per day and 20 transport tank trucks with a minimum of 8,000 USG capacity and drivers to deliver up to 45,000 USG of MOGAS per day to from the KNPC Subhan Terminal to Camp Buehring, Kuwait; Mina Abdullah TFS, Kuwait; and, Cedar II-Tallil AB, Iraq. Trucking services are required to be available on a 24 hours per day, 7 days per week basis.

f. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 10, Paragraph E., is revised as follows:

E. MOGAS AND DIESEL CONTRACT PERFORMANCE PERIOD: One year contract for the period 1 March 2005 through February 28, 2006 (with two (2) six (6) month option periods). DESC reserves the right to reduce/delete transport trucks and change, add or modify transport truck origin points in Kuwait and delivery locations in Kuwait and Iraq as necessary.

g. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 10, Paragraph F.1.e., is revised as follows:

e. Contractor must meet all current Kuwait National Petroleum Corporation (KNPC) Technical Specifications for Truck Loading. The latest version of the referenced KNPC Technical Specifications is attached starting on Page 8 of the subject amendment. Contractors must comply these standards set forth by KNPC and any changes thereto during the life of the contract.

h. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 10, Paragraph F.1.g. is revised as follows:

g. Contractor shall provide licensed and responsible drivers per truck and all necessary services and supplies to include necessary equipment and life support for drivers in the performance of this scope of work. Contractor is responsible for arrangements for necessary visas, fees and passports for its drivers and providing DESC with the names, driver license numbers, copy of passports, copies of birth certificates of transport truck drivers and transport truck identification information. Drivers (1 each per truck) employed by the Contractor must be certified to transport hazardous/flammable goods.

i. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 11, Paragraph F.4.a. is revised as follows:

a. Contractor is responsible for setting up and operating a single staging area within Kuwait for all its trucks under the resulting contract.

j. Clause C600, STATEWORK OF WORK (DESC JAN 1987), Page 13, Paragraph F.8.a. is revised on page 5 of the subject amendment.

k. Clause F40, REQUIREMENT TO PROVIDE ADDITIONAL TRUCKING ASSETS (JAN 2005), contained on page 6 of the subject amendment, is added to Page 17.

l. Clause I81, INDEFINITE QUANTITY (OCT 1995), Page 23, is deleted in its entirety.

m. Clause I211, ORDERING (OCT 1995), Page 25, Paragraph (a) is amended to read as follows:

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from Date of Award through February 28, 2006, for the basic period; through August 31, 2006, for Option Period 1; and through February 28, 2007, for Option Period 2.

n. Clause L74, TYPE OF CONTRACT (APR 1984), Page 27, is deleted in its entirety and replaced on page 6 of the subject amendment.

o. Clause M10, EVALUATION – ALL OR NONE (DESC MAR 2000), Page 28, is deleted in its entirety.

## 2. Offeror Submission Package

a. SF1449, Block 10, Size Standard is $21,500,000.00.

b. The Offer Schedule contained on Page O-4 is revised on page 7 of the subject amendment.

c. Clause L2.05-2, INSTRUCTIONS TO OFFERORS – COMMERCIAL ITEMS (BULK) (DESC JAN 2004), Page O-22, Paragraph (a) is deleted and replaced below.

(a) **NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE AND SMALL BUSINESS SIZE STANDARD.** The NAICS code and small business size standard for this acquisition appear in Block 10 of the solicitation cover sheet (SF 1449). However, the small business size standard for a concern that submits an offer in its own name, but which proposes to furnish an item that it did not itself manufacture, is 500 employees.

**C600 STATEWORK OF WORK (DESC JAN 1987), Paragraph 8:**

8. Quality Requirements-
   a. Contractor shall ensure that tank trucks are dedicated to hauling MOGAS and Diesel and are clean and suitable to receive product. Any truck that does not meet these cleaning requirements will be rejected and turned away. Rejected trucks will not be used until they meet cleaning requirements and are approved by the U.S. Government quality representative. The cleaning requirements are as follows:

CONVERSION CHART FOR TANK CARS, TANK TRUCKS, AND INTERMODAL CONTAINERS[1]

| | PRODUCT TO BE LOADED | |
|---|---|---|
| LAST PRODUCT CARRIED [4] | MOGAS | DIESEL FUEL<br>F76 (B)<br>DF-1, 2<br>DL-1, 2 |
| AVGAS<br>MOGAS<br>JP-4<br>JET B | DRAIN EMPTY | STEAM<br>DRY |
| JP-8, JP-5<br>JET A/A1<br>DF-A, DL-A<br>DFW, KSN, KS1 | DRAIN<br>EMPTY | DRAIN<br>EMPTY [3] |
| F-76<br>DF-1, -2<br>DL-1, -2<br>ASTM D 975<br>NO. 1D, 2D<br>ASTM D 396<br>NO. 1, 2 | DRAIN<br>EMPTY [2] | DRAIN<br>EMPTY [3] |
| ASTM D 396<br>NO. 4L, 4, 5L, 5H, 6<br>IFOs<br>ASTM D 975<br>NO. 4D | STEAM<br>DRY [2] | NO LOAD |
| LUBRICATING<br>OILS | NO LOAD | STEAM DRY |
| JET FUEL<br>JPTS, JP-7 | NO LOAD | DRAIN<br>EMPTY |
| FSII | DRAIN<br>EMPTY | DRAIN<br>EMPTY |

NOTES:
1. When required, drain and empty includes the pump(s), filter(s), meter(s), and hose(s) as applicable.
2. If previous cargo contained dye marker, all traces of color must be removed.
3. If product to be loaded does not contain dye, the vehicle must not contain any traces of dye prior to loading.
4. If product is not listed in this column, permission to load and conveyance preparations require a waiver.

**F40 REQUIREMENT TO PROVIDE ADDITIONAL TRUCKING ASSETS (JAN 2005)**

With at least fifteen days written notice from the contracting officer to the contractor, the contractor is required to provide the specified number of additional trucks and drivers, not to exceed 10% of the number of trucks and drivers under contract, at the daily contract price per truck and driver contained in the contract. The minimum number of days these additional trucks and drivers will be placed on contract is 15 days. The Government may utilize this provision on multiple occasions, as required, throughout the life of the contract, including the option periods.

**L74 TYPE OF CONTRACT (APR 1984)**

The Government contemplates award of a Firm-Fixed Price contract resulting from this solicitation.

(FAR 52.216-1)

NOTE: Review the Statement of Requirements located in the Solicitation on Page A-5- through A-14, and complete the **OFFER SCHEDULE** and **OFFER INFORMATION SHEET.**

**BASIC DELIVERY PERIOD: MARCH 1, 2005 THROUGH FEBRUARY 28, 2006**
**OFFER SCHEDULE**

| ITEM | PRODUCT | TOTAL NUMBER OF TRUCKS REQUIRED PER DAY | DAILY PRICE PER TRUCK(USD) |
|---|---|---|---|
| 0001 | JP8 | 350 | |
| 0101 | MOGAS | 20 | |
| 0201 | Diesel | 70 | |

**NOTE:** Please provide prices for the basic requirement and each option. The Government will evaluate the option prices in accordance with Clause M43.05, EVALUATION OF OPTIONS (JUL 1990) in the Addendum Package. The Government will award truck transportation service contracts under this solicitation for the delivery of **JP8/MOGAS/Diesel** to the responsible offeror(s) that submit(s) the lowest priced, technically acceptable offer. The division of the awards for **delivery of JP8, MOGAS and Diesel** will be on the following basis:

(1) The successful offeror of truck transportation and drivers for delivery of **JP8** must win the entire JP8 delivery requirement. The Government will not make an award to more than one offeror to support the different locations.

(2) The successful offeror of truck transportation and drivers for delivery of both **MOGAS and Diesel** must win the entire requirement for both products. The Government will not make an award to more than one offeror to support the different locations and products.

(3) One offeror may win the entire requirement for truck transportation and drivers for delivery of all products.

(4) Offers for fewer than the number of trucks specified will not be considered. Offers must be in US Dollars (USD).

**OPTION 1 DELIVERY PERIOD: MARCH 1, 2006 THROUGH AUGUST 31, 2006**
**OFFER SCHEDULE**

| ITEM | PRODUCT | TOTAL NUMBER OF TRUCKS REQUIRED PER DAY | DAILY PRICE PER TRUCK(USD) |
|---|---|---|---|
| 0001 | JP8 | 350 | |
| 0101 | MOGAS | 20 | |
| 0201 | Diesel | 70 | |

**OPTION 2 DELIVERY PERIOD: SEPTEMBER 1, 2006 THROUGH FEBRUARY 28, 2007**
**OFFER SCHEDULE**

| ITEM | PRODUCT | TOTAL NUMBER OF TRUCKS REQUIRED PER DAY | DAILY PRICE PER TRUCK(USD) |
|---|---|---|---|
| 0001 | JP8 | 350 | |
| 0101 | MOGAS | 20 | |
| 0201 | Diesel | 70 | |

# Kuwait National Petroleum Company
# Local Marketing Department
# Technical Services Division

## Technical Specifications

**FOR**

## Fuel Road Tankers and Semi Trailer

# Table of Content:

## 1. GENERAL PROVISION

### SCOPE

This Specifications Covers The Minimum Technical Requirement for complete Vehicle

1.1.1. General Design, Complete Installation of Tank and Equipment are according to API – RP 1004, Bs 1449 – Part IB / 1962 Grade EN. 2, BS 4360-43 A.

1.1.2. The Tank along with Vehicle Chassis and Welded joints shall comply with NFPA Code 385.

1.1.3. Detailed drawings shall be submitted to KNPC for preliminary approval before starting of manufacturing. The final approval will be given only after completion of all the works according to the specifications and physical inspection of performance during loading / unloading at K.N.P.C Depots and Filling Stations.

1.1.4. All materials and equipment for the tanker / semi trailer shall be brand new. The tankers shall be suitable for receiving and transporting petroleum product from depot and to be discharged under / above ground tanks at all filling stations.

1.1.5. All materials and equipments such as valves, manholes covers, vents, pumps, couplers, hoses, electro-pneumatic control system etc. shall comply with K.N.P.C specifications, standards and obtained from with K.N.P.C's V.E.C. list.

1.1.6. All vents, manholes and inspection openings protected from damage, in case vehicle overturns, by having them enclosed within the body of the tank or dome attached to the tank or by guards.

1.1.7. All subsystems of tankers / trailers be perform good under the following environmental conditions.

- Temperature (27° F – 185° F) (-2.77° C – 85° C)
- Wind speed 100 Mph.
- Relative humidity (30% - 100%)
- Continuous working hour

1.1.8. Total weight of the fully loaded tank with all accessories and equipment shall be less than maximum permissible load by at least 1000 Kgs.

1.1.9. The manufacturer / supplier shall clearly state and give reasons for any deviations / or non compliance with specifications in a separate deviation list.

1.1.10. Medium : Kerosene / Gas oil / Gasoline , Specific gravity (average) = 0.85

1.2. **THE ACTUAL CAPACITY & REQUIRED NUMBERS** : (to be decided later)

1.2.1 Total nos. of tankers and trailers: 50 to 60 nos.

1.1.2. Nos. of tanker ___ nos. with 24000 liter capacity, all them are two compartment.

1.1.3. Nos. of trailers ___ nos. with 36000 liters capacity, ___ nos. of them will be two compartment.

1.1.4. Nos. of tankers / trailers to be used for Gasoline & Kerosene ___ nos.

1.1.5. Nos. of tankers / trailers to be used for diesel ___ nos.

1.1.6. All of tankers ( ___ nos.) should be equipped with transfer pumps according to K.N.P.C specifications.

1.1.7. Only ____ nos. of trailers should be equipped with transfer pumps according to K.N.P.C specifications, only 10 nos. from them will be two compartment and ____ nos. one compartment.

1.1.8. ____ nos. tankers + ____ nos. trailers should be equipped with hose reel, counter and nozzle, all of them will be one compartment according to K.N.P.C specifications.

1.1.9. ____ no. tanker + ____ nos. trailers should be equipped with suction / discharge pump with all necessary piping system, all of them will be one compartment according to K.N.P.C specifications.

1.1.10. Note that actual capacity of the tanker / semi-trailer as mentioned above should be 5% more than the rated capacity.

## 2. TANK AND VEHICLE DESIGN :

### 2.1. GENERAL :

2.1.1. Design of the tank vehicle shall give engineering consideration to the structure relationship between the cargo tanks, the propulsion equipment, and supporting members if any, with due regard to the weight and temperature of the cargo, road performance, breaking, and required ruggedness. The metal thickness specified in this specifications shall be the minimum thickness dictated by the structure of the tank itself. This thickness shall permitted to be increased where the tank shell is to be subjected to additional stress. The general design of the cargo tank and vehicle chassis shall be arranged to give the best combinations structure characteristics and vehicle performance. The design of the suspensions system shall incorporate features to help assure lateral or tripping when turn corners.

2.1.2. The material used in the construction of the cargo tanks shall be compatible with the chemical characteristics of the flammable and combustible liquid transported.

2.2 CARGO TANKS, PIPING AND CONNECTIONS DESIGNED FOR TRANSFER OF FLAMMABLE AND COMBUSTIBLE LIQUIDS AT TEMPERATURE BELOW THEIR BOILING POINTS.

2.2.1. Material: All sheet and plate material for shell, head, bulkhead and baffles cargo tanks that are required to be constructed in according to the following minimum applicable requirement.

2.2.2.1 Cargo tank shall be manufactured of carbon steel as per the following thickness :

| Shell | Bottom shell | Heads | Baffles |
|---|---|---|---|
| 3 | 4 | 4 | 3 |

All thickness in mm.

2.2.2. Head and Baffles (as per the attached drawing):

2.2.2.1 Head to be dished, one piece and un-welded

2.2.2.2 Baffle should be dished, corrugated or flat with reinforcement (flat baffles without reinforcement are not permitted).

2.2.2.3 Each baffle should have a net area as great as 80% minimum of the cross sectional area of the tank.

2.2.2.4 Baffles should be equally spaced with distance between them or between baffles and head not less than 90 cm but not more 150 cm.

2.3. VEHICLE CHASSIS :

2.3.1. The vehicle for both road tanker and semi-trailer shall be brand new and its model shall be of the same year, as the year of start of this contract.

2.3.2. FOR THE TANKER :

2.3.2.1. Adequate space is required below the chassis to fix two equipment boxes at the both sides.

2.3.2.2 Distance between front and front rear axle center (middle axle) not less than 4500 mm.

2.3.2.3 Distance between front the rear edge of drivers cab & original chassis end not less than 7500 mm (without extension).

2.3.2.4 Any extension required more than the above length should be accepted and certified from the manufacturer.

2.3.3. FOR SEMI-TRAILER :

2.3.3.1 Distance between front & front rear axle center (middle axle) not less than 3200 mm.

2.3.4 SUB FRAME: For load distribution and reinforcement of chassis frame, mounted and manufactured according to chassis maker's regulations, instructions and recommendations.

2.3.5 DRIVER'S CAB: Standard without sleeping cab with proper ventilation system. Classified for petrol product transportation. Not flammable materials shall be used in construction of drivers cab in according with ISO 3795/1989 burn rate not exceeding 100 mm / min. the cab without ash-tray and lighter. Equipped with anti-spark flasher.

2.3.6 DRIVER SEAT: Individual seat vertically and longitudinally adjustable back rest, safety belt.

2.3.7 ENGINE: Internal combustion engine, other that those providing propulsive power, installed or carried on a tank vehicle transporting class I liquids for purpose of providing power for the operation of pumps or other devices shall meet the following requirements, the engine air intake shall be equipped with an affective flame arrester, or an air cleaner having effective flame arrester characteristics, installed and capable of preventing emissions of flame from the intake side of the engine in event of backfire. The fuel system shall be located or constructed so as to minimize the fire hazard. Where the fuel tank is located above or immediately adjacent to the engine, suitable shielding shall be provided to prevent spillage during the filling operation, or leakage from the tank or fuel system, from coming in contact with the engine or any parts of the ignition and exhaust system. All parts of fuel system shell be constructed and installed in proficient matter. Pump and other appurtenance shall be so located in relation to the engine that spillage or leakage from such parts shall be prevented from coming in contact with engine or

any parts of the ignition and exhaust system, or adequate shielding shall be provided to attain the same purpose. The engine cooling fan shall be positioned, rotated, or shielded so at to minimize the possibility of drawing flammable vapor toward the engine. Where the engine is located in a position that spillage from the cargo tank or its appurtenances or form side racks might constitute hazard, shielding shall be provided to such spillage from contacting the engine or engine exhaust system and for draining such spillage away from the vicinity of the engine. Where the engine is carried within an enclose space, provision shall be made for adequate air circulation at all time to prevent accumulation of explosive vapors and to avoid overheating. The exhaust system shall be constructed and installed and routed away from tanks. The exhaust line and muffler shall have adequate clearance from combustible materials, and the exhaust gases shell be discharged at a location that shall not constitute hazard.

2.3.7.1 Engine shall be either 6 or 8 cylinders.

2.3.7.2 Engine shall be Turbo charged is preferable

2.3.7.3 Engine shall be Water cooled,

2.3.7.4 Engine shall be 4 stroke diesel engine.

2.3.7.5 Engine shall be Direct injection system.

2.3.7.6 Engine shall be not less than 250 DIN HP at 2200 RPM.

2.3.7.7 Engine shall be equipped with speed limitation device, speed not to exceed 80 Km/Hr

2.3.7.8 The engine shall have Heavy duty water cooling system with double thermostat centrifugal pump suitable for continues operation under the following conditions :

- Temperature (27° F – 185°F)
- Wind velocity force 100 Miles/H K.N.P.C
- Relative humidity (30% - 100%)

2.3.8 **WEIGHT DATA** : The supplier should clearly state (in Kgs) the followings:

2.3.8.1 Permissible load tank truck (G.V.W & G.C.W)

2.3.8.2 Permissible pay load (+1 ton as a factor of safety)

2.3.8.3 Chassis weight

2.3.8.4 Super structure weight, including all equipment (unloaded)

2.3.9 **GEAR BOX** : Manual , preferable 6 or 8 speeds

2.3.10 **STEERING** : Servo steering , hydraulically assisted or ball and nut (power steering) power assisted

2.3.10 **BRAKE SYSTEM** : 2 circuits compressed air assisted, hand parking brake acting on the rear wheels equipped with classified ABS system

2.3.12 **EXHAUST** :

2.3.12.1 Mounted in front of the axle directed to right side with spark arrestor, (not required is case of turbo charged) discharged in downward direction.

2.3.12.2 The distance between exhaust pipe and any other part not less than 40 mm

2.3.12.3 The exhaust pipe before muffler is one piece pipe

2.3.12.4 Not applicable to extend extra pipe behind drivers cab

2.3.13 Electrical system:

2.3.13.1 2 × 12 V, not less than 100 A.H equipped with batteries master switch inside drivers cab. Anti-static belts. It's preferable to locate the batteries in the driver cabin, but in all cases should be in an appropriate box. The box meant for keeping these batteries should be made out of nonflammable, acid proof and electrically insulated material.

2.3.13.2 Electrical equipment & lightning according to K.N.P.C safety instructions and traffic regulations.

2.3.13.3 The electrical installation as a whole, should meets IEC standard 52a according to classification of vehicle , and shall be so designed constructed and protected such the it cannot initiate any ignition or short circuit under normal condition of use.

2.3.14 Wheels / tires : 1200 – 20, single at front , dual at rear for both rear axles

2.3.1.5 Spare wheel carrier with winch suspended below the chassis frame mounted at the vehicle rear.

2.3.16 Fuel tank : 2 × 200 liter capacity

2.3.17 One piece windscreen of laminated safety glass equipped with suitable wipers.

2.3.18 Fender : oblong shaped of steel sheet

2.3.19 Reinforced rear axles and rear spring

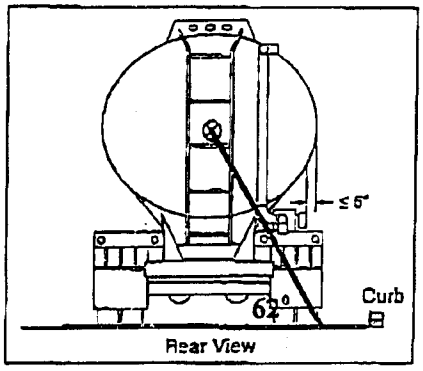
2.3.20 Lifting jack 25 tons with wheel change tools

2.3.21 Painting : red and white according to KNPC design

2.3.22 Rear bumper : made of 20 cm U channel sectional steel through type and located at vehicle's rear at not less than 20 cm away from any tank's equipment and painted with inclined yellow / black fluorescent lines

2.3.23 Tool kit from steel with lockable flap.

2.4 CENTER OF GRAVITY: The height of center of gravity of the maximum permissible liquid load should fall within a isosceles triangle, the base length of which at ground level, is the overall width between the outside walls of the outside tires of the major load carrying axle or axles, and the base angles of which are not more than 62° Degrees.




2.5. TANK CROSS SECTION SHAPE: The shape of the cross section of the tank cargo should be double D shape.

2.6 HOODS , LADDER AND BUMPER : Hoods with a cat walk should be fixed to tanks tops side , sealed and sloped to tankers rear side in such a way that any spillage from any opening will drain automatically to ground through external pipes tanker's rear side. This hood will act as a guard to protect all fittings is case of tanker overturn as specified in NFPA 385 code. Any access facility to the tank, tank top or chassis should comply with following requirements :

2.6.1 The first step height should not exceed 550 mm from the ground

2.6.2 The intermediate steps should be equally spaced and not exceed 300 mm apart

2.6.3 There should be toe hold clearance of 130 mm

2.6.4 The access steps should preferably slope inward the top

2.6.5 Hard hold should be fitted above the height of the top step/rung/platform

2.7 HOSES: Vehicle should be provided with 3 nos. of reinforced light weight hoses made out of polypropylene fabric and film and provided with abrasion resistance outer cover reinforced with internal and external spiral wire of aluminum, so to ensure light weight along with high durability for all petroleum products. (1 No. 4", 1 No. 3", and 1 No. 2½" according to product type) hose of 3 meters length fitted with quick released kamlok couplers, should be provided. Pressure rating of these

hoses should be 150 PSI and these should be kept in special tubes, fitted on both sides of the tankers.

2.7.1 The following connections (fittings) are required for unloading of petroleum products , at KNPC Petrol Filling Stations :

2.7.1.1 4" level operated gravity coupler – OPW 871 – ED or equivalent (2 nos.)

2.7.1.2 4" quick release kamlok adaptor – OPW 633 or equivalent (1 no.)

2..7.1.3 3" quick release kamlok adaptor – OPW 633 or equivalent (1 no.)

2.7.1.4 2½" quick release kamlok adaptor – OPW 633 or equivalent (1 no.)

2.8 VENT AND MANHOLES : Each compartment should be provided with bolted type manhole (500 mm size), in accordance with the requirement of NFPA code 385 and following anti spill safety relief valves to be installed on the manhole cover.

2.8.1 NORMAL VENTING: Pressure / vacuum vent valve (s) set to be open at a pressure of 1 PSI and vacuum of 0.295 PSI which either vent the vapors to atmosphere or provides entry of air from outside, in case the actual exceed the spring controlled settings, as mentioned.

2.8.2 SEPARATE EMERGENCY VENT VALVE (S): Set to open at tank less than 3 PSI and vacuum of 1 PSI.

2.8.3 VAP K.N.P.C RECOVERY / VENT VALVE (S) : Should be pneumatically operated type and its outlet shall be connected to vapor recovery manifold on top of the tank which is opened automatically along with bottom valve while loading or unloading of the tanker / trailer . This valve (s) should have at least venting capacity sufficient to unload the total capacity of the tanker within 15 minutes, during either vapor recovery / non vapor recovery mode of operation. It should be noted that the actual venting to atmosphere during non vapor recovery mode of operation shall be take place through a 'rain cap' covered vent hole in the vapor manifold adjacent to the vapor dump vent valve.

2.8.4 PRESSURE ACTUTAED MANHOLE COVER (S) Having a diameter of 500 mm. set to open at 3 PSI should be fitted on each compartment as a safety device to permit exhaust of enough free air (vapor) K.N.P.C of the tank in case of emergency in according with NFPA code 385. The same cover will be used for maintenance purposes.

2.8.5 In additional to the above , the complete tanker/trailer is provided with one pneumatically operated vapor dump vent valve on the top of the vapor manifold which is used to vent accumulated vapors in the manifold , subsequence of loading / unloading of product to / from the complete tanker / trailer . This valve will actually play a more meaningful role when the 'rain cap' covered vent hole in vapor manifold pipe will be plugged on implementation of vapor recovery system at KNPC Depots.

## 2.9 LOADING AND UNLOADING MECHANISM :

2.9.1 Loading / unloading should be through 4" API dry connection adapters located in equipment cabinet and easily accessible from ground level from both sides of the tanker and compatible with loading points at KNPC depots . Furthermore, the spacing between the two API adaptors installed in the equipment cabinet in case of double compartment tanker / trailer should be such that it is possible to couple in both the loading arms so as to ensure simultaneous loading of product in both compartments if required.

2.9.2 Loading / unloading should be through 4" bottom valve Tee Elbow type pneumatically operated with shear groove (to allow body fracture from this groove keeping internal valve seat closed in case of accident) the operation of the bottom valve in conjunction with the pneumatic vapor recovery / vent valve is controlled by the onboard pneumatic control system depending upon the state of various input signals as indicated in Annexure

2.9.3 A visible sight glass of sufficient thickness / strength should be installed at suitable location on the loading / unloading main pipes before it branches off to both sides of the tank. It should be capable of giving a proper indication of the products color and flow while unloading at filling stations (either by gravity or pump)

2.9.4 Both the compartments should have separated facilities , for loading / unloading of product

2.9.5 A reinforced flexible joint should be fitted between the pipes connected or welded to the tank and those connected or welded to the chassis.

2.9.6 It is required to install a butterfly valve or ball valve on the loading / unloading main pipes main pipes close to the API dry adaptor at both sides of the tanker / trailer.

2.9.7 Each tanker / trailer should be provided with 3 hoses, 3 meters long, size 4", 3" and 2½" in steel tubes located at two sides of the tank, along with adapter from 4" to 4" for gasoline & Kerosene, 4" to 3" for diesel tankers, 4" to 2½" for UL98 tankers to carry out unloading at all filling stations, according to type of product.

2.9.8 Wherever required provision for speedy unloading of product from the tankers and semi-trailers, shall be wither by P.T.O driven pump or by hydraulically driven pump. Separate engine driven pump is not acceptable. The tanker / trailer, that are equipped with transfer pump, should also have facility to carry out unloading by gravity from the two sides. Prior approval of KNPC should be obtained by the manufacturer / supplier, for its proposal on the configuration layout related to installation of transfer pump.

2.10 ELECTRICAL :

2.10.1 All parts if vehicle (tank and chassis) should be electrically bonded together (earthing loop) and connected to the control receptacle inside the equipment cabinet by using petroleum and temperature resistance flexible shielded 2 core cables.

2.10.2 A copper plate (80 × 60 × 6 mm) is directly bonded to the loop and fitted on each side of the vehicle frame for external earthing connection at filling stations & Depots.

2.10.3 All electrical wiring at any point behind the driver's cabin shall be fitted in explosion proof copper conduits and all connections must be of explosion proof type.

2.10.4 A safety cut off switch should be fitted inside driver's cabin to for isolate the complete electrical system from the battery. It is preferable to locate the batteries in driver's cabin in an appropriate box and definitely not be located them behind the drivers cabin. the box meant for keeping these batteries should be made out of non flammable , acid proof and electrically insulating material

2.10.5. Fused explosion proof electrical bulb should be installed to provide enough lighting inside the equipment cabinet. This bulb should be energized automatically whenever the related equipment cabinet door is opened.

2.11 PAINTING & REFLECTORS :

2.11.1 Painting: the tanker should be painted in red and white color combinations in accordance with KNPC specifications. Also, following warning signs should be indicated :

- NO SMOKING
- DANGER – HIGH INFLAMMABLE LIQUIDS

2.11.3 Reflectors: the required number of reflectors should be four which are to be fixed at rear of the vehicle – two pieces , one each side (one on the top of the tank and the other below the rear bumper).

2.12 PRESSURE TEST: At the time of manufacture, every cargo tank shall be tested by minimum air or hydrostatic gauge pressure of 3 PSI or at least equal to the design pressure, whichever is grater. If compartmented, each individual compartment shall be similarly tested with adjacent compartment empty and at atmospheric pressure. Air pressure, if use, shall be held for a period of at least 5 minutes during which the entire surface of all joints under pressure shall be coated with a solution of soap and water, heavy oil, material or other material suitable for the purpose, foaming or bubbling of which indicates sthe presence leaks. Hydrostatic pressure, if used, shall be done by using water or other liquid having similar viscosity, the temp. of which shall be not exceed 38 C during the test, and applying the pressure as prescribed above, gauged at the top of the tank, at which time all joints under pressure shall be inspected for the issuance of liquid to indicate leaks. All closures shall be in place while test by either method is made. During these tests, operated relief devices shall be clamped, plugged, or otherwise rendered inoperative; such clamps, plugs, and similar devices shall be removed immediately after the test is finished. Certificate of hydro test shall be submitted.

2.13 EXTINGUISHERS: Vehicle should be provided with two 9 kg dry power portable fire extinguishers placed on both the sides in special holders along with one B C F fire extinguisher of 1½ kg inside driver cabinet.

## 3. TANKER INSTRUMENTATION:

### 3.1 PNEUMATIC OVERFILL SENSOR AND ASSOCIATED EXPLOSION PROOF PRESSURE SWITCH.

#### a) PNEUMATIC OVERFILL SENSOR:

Should be installed at the top of each tank compartment adjacent to the Optic Overfill probe and shall meet the following requirements.

- Should be rated for use in Class I, Div. I, Group D hazardous location and capable of operating satisfactorily under metal temperature of 85° C, during extreme summer in Kuwait.
- Adjustable sensing height.
- Should be based on highly reliable and full-proof mechanism for sensing of level such that no bleeding of air takes place inside the tank mixing with petroleum vapor this reducing load on the Vapor Recovery System. Also ensure least motion of any of its part thus achieving long life and stability of its calibration under the dynamic adverse conditions associated with such an application.
- Compatible with the Tanker Pneumatic Control station as well as "Load Ready" status 'SPDT' type pressure switch.
- The sensor shall be installed near the manhole cover so that it is easily accessible to test the operation of this sensor whenever required.

#### b) LOAD READY' STATUS 'SPDT' TYPE PRESSURE SWITCH.

Should be installed at an appropriate location in the equipment cabinet of the tanker compartment and meet the following requirements.

- Should be rated for use in Class-I, Div, - I, Group-D hazardous location and capable of operating satisfactorily under metal temperature of 85° C during extreme summer in Kuwait.
- Shall provide 1 no. of isolated potential free (N.O) electrical contact connected to optic 10 pin socket, located in the equipment cabinet installed on the tanker.
- The switch is operated by the pneumatic interlock signal which is actuated by pressing the 'LOAD' button on the pneumatic control station subsequent to sequential opening of the Vapor Recovery / Vent valve and the bottom valve under the presence of pneumatic overfill sensor signal and brake interlock signal.

- Figure (1) below for clarification

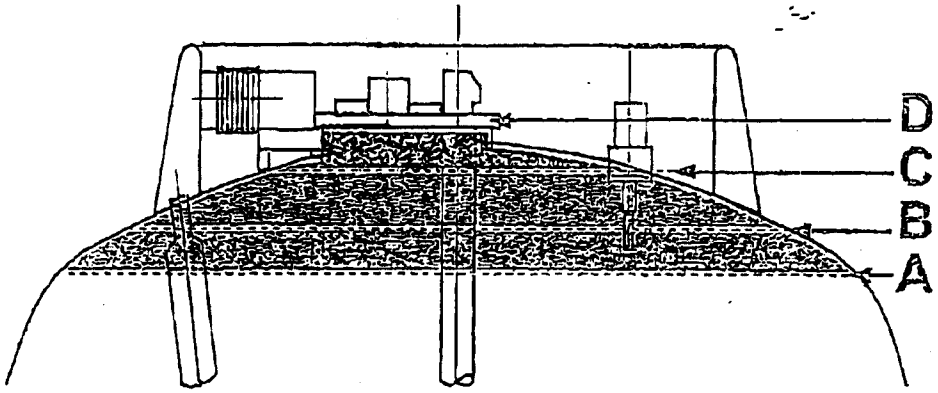



Figure Notes

A = Nominal capacity level of compartment
B = level at which overfill prevention probe triggers
C = level of opening into vapour transfer valve
D = level to liquid full

*Distance* between level A and level B ≥ 10 mm.

*Volume* level B to level C should be 150 litres minimum.

Fig. (1) Net effective ullage space

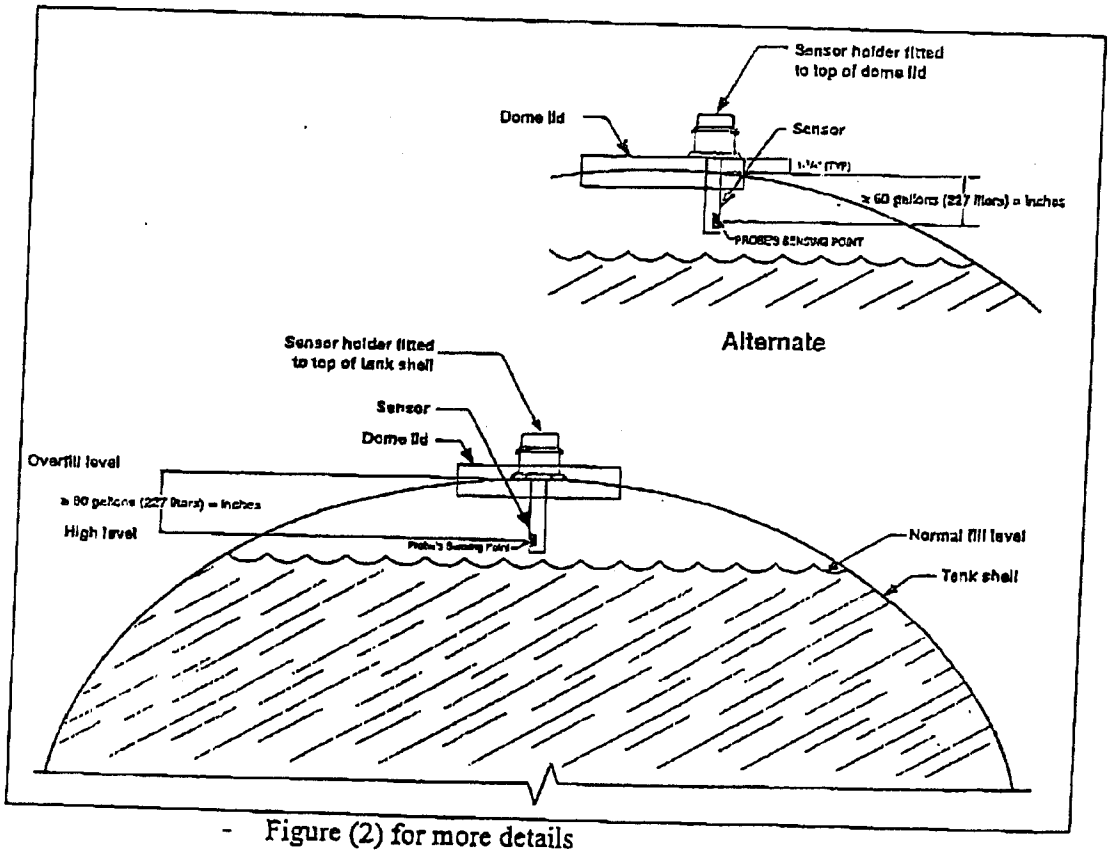
## 3.2 INTRINSICALLY FAIL SAFE EARTHING AND OVERFILL SYSTEM ALONG WITH RETAINED PRODUCT MONITORING FACILITY.

It should be noted that Ahmadi & Sabhan Depot have been provided with Station of Art Gantry Control System capable of monitoring 'Infra Red Optic based Overfill Probe' as well as 'Retained Product Probe' and 'Vehicle Static Grounding' corresponding to each compartment of the tanker so as to ensure maximum possible safety during the loading process.
Therefore, it is required to provide the following sensors similar to products from M/s. Scully or equivalent for each of the tanker compartment in addition to the Pneumatic Overfill Sensor as stated in 7.1 above.

a) **INFRA RED OPTIC OVERFILL FLANGED PROBE ALONGWITH HOLDER**

Should be installed on the top of each tank compartment and shall meet the following requirements.

- Should be rated for use in Class I, Div. I, Group D hazardous location and capable of operating satisfactorily under metal temperature of 85° C during extreme summer in Kuwait.
- Adjustable sensing height.
- 2 wire probe based on infra red optic liquid level sensing technology having no moving parts and capable of supporting self diagnostic facility.
- Compatible with the Gantry Control System installed at Ahmadi & Sabhan Depot.




- Figure (2) for more details

Fig. (2) End view of trailer showing various levels and two methods of mounting sensor

b) RETAINED PRODUCT PROBE AND HOLDER:

Should be installed at the bottom of each tank compartment and shall meet the following requirements.

- Detects small quantities of liquid products.
- Should be rated for use in Class I, Div. I, Group D hazardous location and capable of operating satisfactorily under metal temperature of 85° C during extreme summer in Kuwait.
- 2 wire probe based on infrared optic liquid level sensing technology having no moving parts and capable of supporting self diagnostic facility.
- Compatible with Gantry Control System installed at Ahmadi & Sabhan Depot.

c) OPTIC 10 PIN SOCKET WITH 4 J SLOTS

Optic overfill probe, retained product probe, Electronic ground bolt and 'Load Ready' status contact, as well as compartment identification contact should be electrically connected to a suitable Optic 10 pin socket with 4J slots accessible on both sides of the Tanker / Trailer. This socket should be compatible with the corresponding 'Plug and Cable' assembly associated with Gantry Control System. Typical allocation of pins of this socket, is indicated in Annexture-D.

d) VEHICLE STATIC GROUNDING SYSTEM.

Specially designed electronic ground bolt should be installed on the tanker frame and electrically connected to Optic 10 pin socket with 4J slots on both sides of the Tanker / Trailer compatible with Gantry Control system such that static ground of vehicle's frame is accomplished in an intrinsically failsafe manner.

3.3 Typical details of onboard Pneumatic Control System configuration for each side of a tanker compartment and the list of various tanker instrumentation and control system related items as applicable to single compartment and double compartment tanker / semi trailer are indicated in Annexture-A & B respectively.

4. VAPOR RECOVERY SYSTEM

It should be noted that both the KNPC depots and Filling Stations are not presently equipped with the Vapor Recovery Systems. However, these facilities are likely to be equipped with Vapor Recovery Systems during the tenure of this transportation contract.

Therefore, it is essential to equip these Tankers / Semi trailers with all the features to facilitate current operation of these tankers in non-vapor recovery mode as well as provide all the essential components right now to ensure easy adaptation to vapor recovery mode of operation, in future.

Consequently, Vapor Recovery System for each Tanker / Semi-trailer must be designed in accordance with API-RP 1004 to prevent build-up of high pressure vacuum during the process of leading /unloading in either vapor recovery or non-vapor recovery mode of operation as required. The various required features in this respect are, as follows:-

4.1 Vapor Recovery / Vent valve will be used as Vapor Recovery valve in the vapor recovery mode of operation when used in conjunction with Vapor Recovery System at KNPC Depot and Filling Stations and its outlet shall be connected to a vapor recovery manifold on the top of the tanker. During the non-vapor recovery mode of operation, this vapor recovery / vent valve will be used as Vapor vent valve to vent the vapors generated during loading and allow the air to enter the tank during unloading process by virtue of rain cap covered hole in the vapor manifold adjacent to vapor dump vent valve.

This vapor manifold should be fabricated out of 4" pipe and should be covered by a Rollover hood to ensure safety of vapor manifold, in the event of an accident.

4.2 Vapor Recovery Adaptor along with Pneumatic interlock switch & dust cover shall be installed in the equipment cabinet on each side of the Tanker / semi trailer. This will be connected to the vapor manifold through a 4" diameter vapor pipe. Only one Vapor Recovery Adaptor shall be provided on each side of the tanker irrespective of the no. of compartments.

4.3 Pneumatically operated Vapor dump vent valve shall be installed on the vapor manifold which will really play a meaningful role only when the 'Rain cap covered hole' in vapor manifold will be plugged for all tankers subsequent to installation of Vapor Recovery System at KNPC Depots and Filling Stations.

4.4 The main task of this valve shall be to evacuate the trapped vapors in the vapor manifold subsequent to 'Loading' as well as 'Unloading' process. Accordingly, in indicator should be provided on the equipment cabinet, to indicate status of this valve.

## 5. PNEUMATIC CONTROL SYSTEM

The pneumatic control system as applicable to each side of a Tanker compartment is indicated in Annexture-A that clearly indicates the source of various input signals to Pneumatic Control Station which in turn provides the pneumatic output signals to drive the final control elements in accordance with the fail-safe logic, as defined below, to ensure highest possible safety during loading / unloading of Petroleum Products to /from the Tanker / Semi-Trailer. The various essential features of the required control system configuration are as follows:-

## 5.1 OPERATION LOGIC PNEUMATIC CONTROL SYSTEM

Each side of a tanker compartment is provided with a pneumatic control system to carry out the process of loading / unloading which is initiated by using 'Stop', 'Load' and 'Unload' buttons located on the front panel of this station. The logical sequence of operation is as follows:-

a) **Tanker Loading:-**
The operation sequence associated with the loading process is as follows once the driver has parked the tanker, at the loading gantry of typical KNPC Depot.

i) The driver opens the door of equipment cabinet located on the side of the tanker which in turn actuates a 'Lever operated pneumatic switch'.

ii) This is followed by connecting the Plug and Cable assembly at Gantry to the optic socket followed by the coupling of product hose which in turn provides a Brake Interlock signal on using the appropriate combination of Pneumatic logic gates, driven by the associated Pneumatic signals from Interlock Pneumatic switches of API adaptor and Vapor adaptor such that Brake Interlock signal is available when either API adaptor or Vapor adaptor or both are coupled to the loading arm. Furthermore, Vapor dump vent valve is closed when the vapor adaptor is coupled and the corresponding status of Vapor dump vent valve is indicated on a separate pneumatic indicator, installed on Pneumatic control station.

iii) Once the above conditions are satisfied along with the condition of low level inside the tanker compartment, the system is ready for pressing the 'Load' button Actuation of 'Load' button shall result in sequential operation as follows:-

- Opening of Vapour Recovery / Vent Valve.
- Actuation of 'SPDT' pressure switch to provide 'Load Ready' status contact to Gantry Interlock System.
- Actuation of Pneumatically driven 'Load' status indicator to change its state from 'Red' to 'Green'.

iv) Now the tanker is ready to accept the product from loading arm after opening the associated valve and accordingly, loading of product in the tank is started by pressing the 'Start' button on electronic preset located at the gantry.

v) Subsequently, the driver carries out the following action in sequence at the end of loading the preset quantity in the tanker.

- Press the 'Stop' button on pneumatic control station to clear the 'Load Ready' status indicator to 'Red'.
- Decouple the vapor loading arm from vapor adaptor and Product loading arm from API adaptor associated with the compartment and close the associated manual valves.
- Disconnect the 'Plug & Cable' assembly from the optic socket associated with the compartment.
- Close the Equipment cabinet door.

vi) Now the tanker is ready to be driven away to its destination Filling Station.

D) Tanker Unloading

The operation sequence associated with the unloading process is as follows, once the driver has parked the tanker close to the relevant filling point, at a typical KNPC Filling Station.

i) The driver opens the door of equipment cabinet located on the side of the tanker which in turn actuates a 'Lever operated Pneumatic switch'.

ii) This is followed by connecting the earthing clip at the Filling Station to the copper plate bonded to tanker frame followed by the coupling of product discharge hose and vapor hose to the filling point and vapor recovery point; which in turn provides a brake interlock signal on using the appropriate combination of pneumatic logic gates driven by the associated pneumatic signals from interlock pneumatic switches of API adaptor such that brake interlock signal is available when either API adaptor or Vapor adaptor or both are coupled to the loading arm and vapor adaptor. Furthermore, vapor dump vent valve is closed when the vapor adaptor is coupled and the corresponding status of vapor dump vent valve is indicated on a separate pneumatic indicator installed on pneumatic control station.

iii) Once the above conditions are satisfied, the system is ready for pressing the 'Unload' button. Actuation of 'Unload' button shall result in sequential operation as follows:-\

- By passing of Pneumatic Overfill sensor to take care of erratic triggering of overfill sensor as a result of slope encountered by the tanker on site.
- Opening of Vapor Recovery / Vent Valve.
- Opening of Bottom Valve
- Actuation of Pneumatically driven 'Unload' status indicator to charge its state from 'Red' to 'Green'.

iv) Now the tanker is ready to deliver the product to Filling Station and accordingly unloading of product takes place by opening the associated valve.

v) Subsequently, the driver carries out the following actions in sequence at the end of complete unloading of compartment after confirming the same in side glass.

- Press the 'Stop' button on Pneumatic Control Station of product to clear the 'Unloading ready' status indicator from 'Green' to 'Red'.
- Decouple the vapor hose and product hose from vapor adaptor and API adaptor associated with the compartment.
- Disconnect the earthing clip from the copper plate associated with the tanker.
- Close the equipment cabinet door.

vi) Now the tanker is ready to be driven back to KNPC Depot for loading once again.

## 5.2 TECHNICAL CHARACTERISTICS OF PNEUMATIC CONTROL ELEMENTS.

a) The 'Stop', 'Load' and 'Unload' button on the pneumatic control station should be tamper proof and interlocked in such a way that does not permit simultaneous operation of two buttons.

b) All the Pneumatic logic gates used in the control system should be designed in such a way that the pneumatic signal on each of their port is totally isolated from another port of the same device.

c) Separate pneumatic logic 'OR' gates should be used to interface the signal from both sides of the tanker to various final control elements i.e valves, pressure switch etc.

d) Bottom valve signal should be interfaced through Quick exhaust valve of sufficient capacity, to ensure speedy bleeding of air to facilitate its fast closure in the event of actuation of overfill sensor.

e) The control system should be designed in such a manner so as to ensure failsafe operation under any fault condition.

f) Petroleum and Temperature resistant clear Polypropylene tubing should be installed in G.I Pipes so as to ensure reliable transmission of Pneumatic signals under all condition.

## 5.3 MECHANICAL INSTRUMENTATION

The relevant specifications of Tanker's calibration dip stick, metered dispensing system and volumetric gauging system are attached as Annexture-1,2 & 3 respectively.

Annexture - I

## TANKER'S CALIBRATION

1. Contractor should provide a dip stick for each compartment indicating the tanker and compartment number.

2. Contractor should provide a calibration chart for each tanker / compartment which matches the calibrated dip stick.

3. The dip stick should be graduated in steps of 250 litres.

4. Tanker calibration should be done by filling the tanker in steps of 250 litres using proven master meter as reference. Accordingly, the graduations should be marked on the dip stick.

5. Graduation accuracy should be within ± 0.2%

6. Dip stick graduations should be verified against the standard calibration data of the tanker to identify any major discrepancy.

7. Contractor is required to perform the calibration of each tanker/ semi trailer compartment in the presence of K.N.P.C staff before any approval could be granted for using the same to load petroleum products.

Annexture - 2

# TANKER WITH DISPENSING SYSTEM

1. Contractor shall supply tankers (2 Tanker + 2 Semi Trailer) ready for dispensing the product directly to the customers.

2. Each tanker should be equipped with self rewinding hose reel, meter with counter and automatic nozzle.

3. Hose Reel: should be self rewinding type, of 1" Diameter and 20 feet lengh.

4. Meter with Counter :

   - To provide indication of dispensed quantity in litres.
   - Should have accuracy of ± 0.1%
   - Should have two counters:
     i) 4 Digit re-settable counter to indicate individual fuel sale.
     ii) 7 Digit non-re-settable counter for indicating a cumulative total.

5. Ball valve should be fitted between hose reel and meter.

6. 1" Automatic nozzle : will be hung beside the meter counter and mechanically coupled to its reset mechanism.

All the above equipments should be kept in lockable cabinet at the right side beside the equipment box.

Annexture - 3

## TANKER'S VOLUMETRIC GAUGING SYSTEM

1. Contractor should provide an accurate and classified volumetric gauging system on the right side of tanker, for indicating the quantity inside the tank. The reading on the gauge should be match the dipstick reading.

2. Volumetric indicator of the gauging system should be physically located at the tanker's mid point.

3. Principle of operation of the gauging system shall be mechanical and consists of float coupled to the calibrated 8" gauge.

4. Gauging system should have least possible moving parts and should be easily maintainable.

5. The gauging system should be reliable & easy to calibrate.

TYPICAL ONBORAD PNEUMATIC CONTROL SYSTEM CONFIGURATION, AS APPLICABLE TO EACH SIDE OF A TANKER COMPARTMEN